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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,824	08/21/2003	Yoshihiro Shiroishi	500.37488CC5	6177

20457 7590 12/05/2005

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EXAMINER

CHEN, TIANJIE

ART UNIT	PAPER NUMBER
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2656

DATE MAILED: 12/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/644,824

Applicant(s)

SHIROISHI, YOSHIHIRO

Examiner

Tianjie Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 4 and 6-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4 and 6-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## ***Final Rejection***

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 4, 7, 9, 10, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crue et al (US 6,043,959) in view of Hong et al (US 6,423,430), Han et al (US 6,024,886), Cai (US 6,191,911), and Sedlmayr et al (US 5,761,166).

Claim 4, 7, and 13, Crue et al shows a magnetic head for writing data at a high areal density (Column 1, lines 6-8) in a magnetic recording and reading device, and Hong et al show magnetic recording medium with large Kerr rotation angle enough to present reliable reproducing characteristics (Column 2, lines 50-54). One of ordinary skill in the art would have been motivated to combine these two together to form a magnetic recording and reading device for having reliable reproducing characteristics. The above constructed device includes: a magnetic recording medium having a substrate 11 (Fig. 2 in Hong et al; claim 5) and a magnetic layer formed on the substrate, a magnetic head comprising a recording head having a magnetic core having a magnetic core lengths of L1 and L2 not more than 35  $\mu\text{m}$  (Column 12, lines 30-32) made of CoZrNb with inherent resistivity of more than 50 $\mu\Omega$ , and an inherent R/W-IC; Hong et al shows in claim 2 that the magnetic layer contains (1) Co, (2) Cr, and (3) Gd, which is in an amount not more than 15 atomic % (Hong et al's claim 2).

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Crue et al shows a reading head provided with a read element 112 (Fig. 14, column 7, line 65), but does not show that track width

Han et al shows a MR a track width of not more than  $0.9\text{ }\mu\text{m}$  (Column 7, lines 40-42).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply the track width taught by Han et al into Crue et al's device. The rationale is as follows: Crue et al's device is used for high areal density. It is well known in the art that a narrow track width is important for high areal density recording and reading device. Han teaches a device with narrow track width. One of ordinary skill in the art would have been motivated to use this track width to reach high areal density in recording and reading.

Cai et al shows that at the time the invention was made, magnetic (Column 1, line 19) recording and reading device, which is commercially available, would have storage density of  $2.7\text{GB/ inch}^2 = 21.6\text{Gb/inch}^2$  (Column 1, lines 27-31). Four years before this Application was filed, Sedlmayr et al shows that a contemporary magnetic (Column 1, line 48) recording and reading device has data rate of  $100\text{MB/s}$  or more (Column 3, lines 34-35). One of ordinary skill in the art would have been reasonably expecting that the device has density of more than  $5\text{Gb/in}^2$ .

Claim 9; Hong et al further shows in claim 1, that the magnetic recording medium further comprises a non-magnetic intermediate layer containing Si (Column 4, lines 13-18).

Claim 10, Hong et al shows that magnetic recording medium has a perpendicular anisotropy magnetic recording layer (Column 2, lines 53-55).

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2. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crue et al in view of Hong et al and etc. as applied to claim 4 above, and further in view of Linliu et al (US 5,773,199).

In Crue et al's device, there is an inherent R/W-IC, but does not specify the linewidth.

Linliu et al shows a method for forming advanced integrated circuits, electrical element, and patterned layers of linewidth dimension at least as low as about 0.25 microns (Column 3, lines 5-8).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply Linliu's method Crue et al's device. The rationale is as follows: Linliu teaches that there has been a continuing trend towards decreasing linewidth dimensions (Column 1, lines 22-25) of electrical circuit element and patterned layers. One of ordinary skill in the art would have been motivated to apply Linliu's method to decrease linewidth to at least less than 0.25 microns, which is less than 0.235 microns.

3. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crue et al in view of Hong et al and etc. as applied to claim 4 above, and further in view of Shiratori et al (US 6,180,208).

Claim 8, Crue et al shows magnetic layer, but does not show the crystallinity of the layer.

Shiratori et al shows that the magnetic layer in a magneto-optical disk is amorphous (Column 6, lines 16-22). One of ordinary skill in the art would have been motivated to recognize that the magnetic layer in Hong et al's disk is amorphous.

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4. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crue et al in view of Hong et al and etc. as applied to claim 4 above, and further in view of Huber (US 6,178,144).

Hong et al shows that the magnetic medium is a magneto-optical recording medium, but does not specify that it has a granular structure.

Huber teaches that conventional magneto-optical medium inherits granular structure (Column 9, lines 43-45). It is also well known in the art, that magneto-optical recording medium has certain kind crystalline structure, and since it is a thin and wide sheet, it can not be a single crystal. Therefore, it must be composed from large number of crystal grains, i.e. it has granular structure. One of ordinary skill in the art would have been expecting that Hong et al's magneto-optical medium also has granular structure.

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crue et al in view of Hong et al and etc. as applied to claim 4 above, and further in view of Yamashida et al(US 6,215,609).

Crue et al and Hong et al do not show that speed of the magnetic disk.

Yamashida et al shows a magnetic hard disk drive (Column 11, line 43-44) with surface density 4GB/in<sup>2</sup>, which is close to Grue et al, Hong wt al, and etc.'s device, operated at a speed of 12000 rpm (Column 11,lines 52-53). It would have been obvious at the time the invention was made one of ordinary skill in the art would have set the speed at 12,000 rpm. The rationale is as follows: it is well known in the art the higher rpm would lead to higher data rate, which is commonly desired. One of

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ordinary skill in the art would follow Yamashida et al's teaching to set the speed at 12,000 rpm to obtaining high data rate.

### ***Response to Arguments***

6. Applicant's arguments with respect to claim 4 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

7. The prior art made of record in PTO-892 Form and not relied upon is considered pertinent to applicant's disclosure.

- US 6,002,555 to Tagawa shows in column 4, line 44 that CoNbZr has resistivity of more than 70  $\mu\Omega\text{cm}$ .

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tianjie Chen whose telephone number is 571-272-7570. The examiner can normally be reached on 8:00-4:30, Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on 571-272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**TIANJIE CHEN**  
**PRIMARY EXAMINER**